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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,911	06/15/2001	John A. Michejda	MICHEJDA 4-6	9771
27964	7590	11/26/2003	EXAMINER	
HITT GAINES P.C. P.O. BOX 832570 RICHARDSON, TX 75083			FENTY, JESSE A	
			ART UNIT	PAPER NUMBER

2815

DATE MAILED: 11/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/882,911

Applicant(s)

MICHEJDA ET AL.

Examiner

Jesse A. Fenty

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mw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Response to Arguments

1. In view of the Appeal Brief filed on 08/14/03, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4, 7, 9, 10, 12, 15 and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Subramanian et al. (U.S. Patent No. 5,494,837).

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In re claims 1, 9 and 17, Subramanian (Figs. 3A-3L) discloses a semiconductor device and method of forming the same, comprising:

A channel region (C) located in a semiconductor substrate (10);

A trench (24) located adjacent a side of the channel region;

An isolation structure (30) located in the trench;

A sidewall spacer (30) located over at least one sidewall (24b) of the trench distal the channel region;

A source/drain (S, D) region located over the isolation structure; and

Dielectric layers (16) located over the semiconductor devices and having interconnect structures (36) located therein that electrically connect the semiconductor devices to form an operative-integrated circuit.

In re claims 2, 10 and 18, Subramanian discloses the devices of claims 1, 9 and 17 respectively, wherein the trench is a first trench and the semiconductor device further includes a second trench located on an opposing side of the channel region, wherein the isolation structure is a first isolation structure (30) located in the first trench and the semiconductor device further includes a second isolation structure (30) located in the second trench, and wherein the source/drain region is a first source/drain region and the semiconductor device further includes a second source/drain region located over the second isolation structure.

In re claims 4 and 12, Subramanian discloses the devices of claims 1 and 9 respectively, wherein the source/drain region comprises epitaxial silicon (column 5, lines 44-51).

In re claims 7, 15 and 19, Subramanian discloses the devices of claims 1, 9 and 17 respectively, wherein the isolation structure comprises an oxide (column 5, lines 28-31).

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In re claim 20, Subramanian discloses the device of claim 17, wherein the semiconductor devices from part of an NMOS device, a PMOS device (Fig. 5M) or a bipolar device (Fig. 5M).

In re claims 21 and 22, Subramanian discloses the devices of claims 1 and 9 respectively, wherein the sidewall spacer is not contiguous the side of the channel region.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian as applied to claims 1 and 9 above, and further in view of Blanchard (US 2001/0000111 A1).

In re claims 3 and 11, Subramanian discloses the devices of claims 1 and 9 respectively, but does not expressly disclose the source/drain region comprising polysilicon. Blanchard (Fig. 1) discloses source/drain regions comprising polysilicon (109). It would have been obvious for one skilled in the art at the time of the invention to use polysilicon source/drain regions as disclosed by Blanchard for the device of Subramanian for the purpose, for example, eliminating hot carrier effects or improving circuit element density (Blanchard; pp. 3, section [0023, lines 15-17, 21-25]).

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6. Claims 5, 6, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian as applied to claims 1 and 9 above, and further in view of Komori et al. (U.S. Patent No. 5,598,019).

In re claims 5, 6, 13 and 14, Subramanian discloses the devices of claims 1 and 9 respectively, but does not expressly disclose an oxide layer located between a nitride sidewall spacer and at least one sidewall of the trench. Komori (Fig. 47) discloses an oxide layer (12) located between a nitride sidewall spacer layer (15) and a trench (10). It would have been obvious to one skilled in the art at the time of the invention to use a multi-layer insulation structure as disclosed by Komori for the device of Subramanian for the purpose, for example, of enhancing the isolation capability and reliability of the device (Komori; column 17, lines 53-58).

7. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian as applied to claims 1 and 9 above, and further in view of Pan (U.S. Patent No. 5,814,863) and Tseng (U.S. Patent No. 5,753,557).

In re claims 8 and 16, Subramanian discloses the devices of claims 1 and 9 respectively, comprising highly doped contact regions (32) but does not expressly disclose the source/drain regions comprising LDD regions. Pan and Tseng disclose semiconductor devices with LDD and highly doped contact regions comprising dopant concentrations ranging from about $1\text{E}16$ atoms/ cm^3 to about $1\text{E}17$ atoms/ cm^3 and forming highly doped source/drain contact regions having a dopant concentration up to about $1\text{E}22$ atoms/ cm^3 (Tseng, column 5, lines 57-64; Pan, column 5, lines 13-18, 30-36). It would have been obvious for one skilled in the art at the time of the invention to form doped regions of Subramanian in the manner disclosed by Pan and

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Tseng for the purpose, for example, of spreading out the high electric field near the drain junction, allowing the device to be operated at a higher supply voltage with fewer hot-electron problems (column 1, lines 55-63).

Response to Arguments

8. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

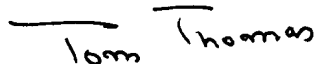
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 703-308-8137. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jesse A. Fenty
Examiner
Art Unit 2815

JAF


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800